University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

Nebraska Beef Cattle Reports | Animal Science Department

2014

Effect of Distillers Grains Plus Solubles Supplementation on Grazing Cattle Performance

Tyler L. Hasenauer
University of Nebraska–Lincoln

Terry J. Klopfenstein
University of Nebraska–Lincoln, tklopfenstein1@unl.edu

James C. MacDonald Donald
University of Nebraska–Lincoln, jmacdonald2@unl.edu

Cody J. Schneider
University of Nebraska–Lincoln

Dirk B. Burken
University of Nebraska–Lincoln

Follow this and additional works at: https://digitalcommons.unl.edu/animalscinbcr

Part of the Large or Food Animal and Equine Medicine Commons, Meat Science Commons, and the Veterinary Preventive Medicine, Epidemiology, and Public Health Commons

Hasenauer, Tyler L.; Klopfenstein, Terry J.; MacDonald, James C. Donald; Schneider, Cody J.; and Burken, Dirk B., "Effect of Distillers Grains Plus Solubles Supplementation on Grazing Cattle Performance" (2014). *Nebraska Beef Cattle Reports*. 761.
https://digitalcommons.unl.edu/animalscinbcr/761

This Article is brought to you for free and open access by the Animal Science Department at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Beef Cattle Reports by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Effect of Distillers Grains Plus Solubles Supplementation on Grazing Cattle Performance

Tyler L. Hasenauer
Terry J. Klopfenstein
Jim MacDonald
Cody J. Schneider
Dirk B. Burken[1]

Summary

Yearlings rotationally grazing smooth bromegrass were individually supplemented modified distillers grains plus solubles (MDGS) at .05, 0.4, 0.6, and 0.8% BW. Gain increased quadratically as MDGS level increased. Maximal ADG (2.95 lb/d) was predicted when supplementing level of 0.48% of BW. Economic analysis compared 0, 2, and 5 lb (DM) MDGS supplementation. When cattle ownership was retained through the feeding period, MDGS supplementation was profitable. Supplementation at 2 lb (DM) was more profitable than 5 lb (DM) when MDGS is above $265.63/ton (DM) or 85% the price of $7.50 /bu corn.

Introduction

High grain prices and drought have increased the need to maximize the grazing resources. Supplementation of ethanol byproducts is an effective tool in managing forage supply without sacrificing cattle performance. Metabolizable protein (MP) is the first limiting factor for yearling steers grazing smooth bromegrass. Distiller grains plus solubles (DGS) meet MP requirements with 24% CP and 65% rumen undegradable protein (RUP). Supplementing DGS also provides energy. Previous research determined dried distiller grains (DDG) to be 127% the energy value of dry-rolled corn in forage diets (2003 NE Beef Report pp. 8-10). Research has shown DGS supplementation allows growers to increase stocking rate and ADG (*2010 Nebraska Beef Cattle Report* pp. 24-25). However, rising DGS prices may impact the optimum supplementation level. Likewise, the optimum levels may differ whether for performance or for economics.

Procedure

Experimental Design and Animal Performance

Crossbred yearling steers (n = 30, BW = 736 ± 71 lb) were utilized in a complete randomized design and assigned to one of four treatments. The treatments were based on increasing supplementation levels of modified distiller grain plus solubles (MDGS) at .05, 0.4, 0.6, and 0.8% of BW. Daily, each steer was individually supplemented MDGS in an individual feeding barn. The remainder of the day, cattle grazed smooth bromegrass pasture. Cattle were managed in an intensive rotational grazing system (117 days). Cattle were moved every 4 – 6 days from April 27, 2012, through July 20, 2012. The dry summer conditions forced the cattle to be moved to an extra pasture from July 20 to Aug. 24. The move to the extra pasture allowed the cattle adequate forage supply.

Prior to the trial, steers were limit-fed a common diet at 2% of BW for five days to minimize gut fill variation. Steers were weighed three consecutive days to determine initial BW. Interim, one-day weights were taken at the end of each 24- to 36-day cycle. Following the fifth cycle, steers were limit-fed a common diet for five days and weighed to establish ending BW. Animal ADG was calculated for the 117-day grazing season using initial and ending BW. Individual orts were recorded and actual MDGS intakes were calculated.

Performance of non-supplemented steers, from the same pool of cattle on a similar grazing rotation, were used to create a regression equation to estimate ADG in relation to the amount of MDGS supplemented. The regression equation was developed using actual MDGS DMI and ADG. Efficiency improvements due to daily MDGS supplementation at 0, 2, and 5 lb/steer (DM) were calculated.

Performance and actual MDGS intake were analyzed using the SAS MIXED procedure (SAS Institute, Inc., Cary, N.C.). Steer was the experimental unit and supplementation level is the fixed effect. Maximal gain was determined using a regression formula using actual MDGS intake and ADG.

Economic Analysis

Assuming retained ownership through the feeding period, profitability differences (partial budget) were calculated for supplementing MDGS to steers at 0, 2, and 5 lb (DM) during a 120-day summer grazing period. Calculations were established using corn at $5.50/bu and $7.50/bu, distillers priced at 85% and 100% the price of corn (DM basis), and finished steers priced at $120.00 cwt. The respective costs of MDGS, on DM basis were $194.79, $229.17, $265.63, and $312.50/ton. The as-is price of MDGS would depend on the DM content of the MDGS. Delivery cost of supplementation was assumed at $0.10/steer daily.

Performance from earlier research (*2005 Nebraska Beef Cattle Report*, pp. 18-20 and *2006 Nebraska Beef Cattle Report*, pp. 30-32) was included, resulting in ADG of 1.55, 2.10, and 2.37 lb. The expected efficiency of weight retained in the feedlot from cattle supplemented 2 lb and 5 lb (DM) MDGS is 100% and 96.1%, respectively (*2006 Nebraska Beef Cattle Report*, pp. 18-20 and *2011 Nebraska Beef Cattle Report*, pp. 31-32). Cattle consumed the same amount of feed in the feedlot; therefore, the cost is assumed to be equal.

The assumed pasture rent price

© The Board of Regents of the University of Nebraska. All rights reserved.

Table 1. Grazing steer ADG improvement with MDGS supplementation levels.

		Improvement	
MDGS, lb (DM)	ADG, lb (DM)	Comparison, lb (DM)	Change, %
0	1.55	—	—
2	2.10	0 v 2	26.3%
5	2.37	2 v 5	11.1%

2005 Nebraska Beef Cattle Report, pp. 18-20; *2006 Nebraska Beef Cattle Report*, pp. 30-32; and Current Study (176 head).

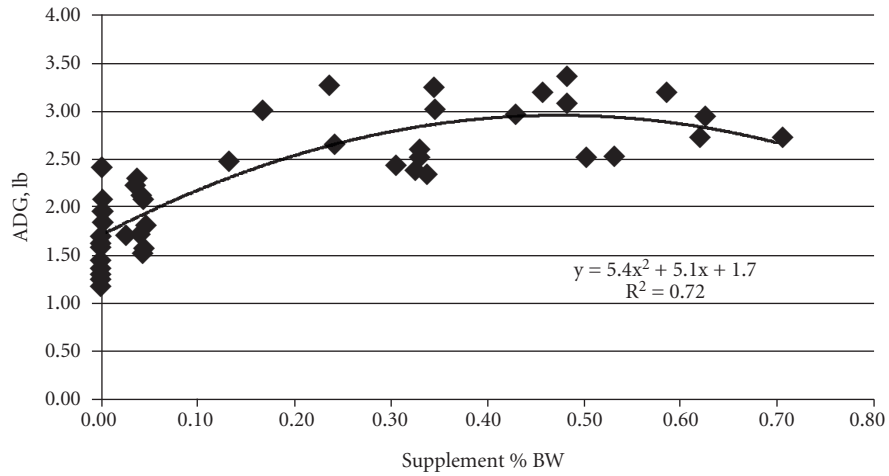

Figure 1. Effect of actual MDGS supplement intake on grazing steer ADG.

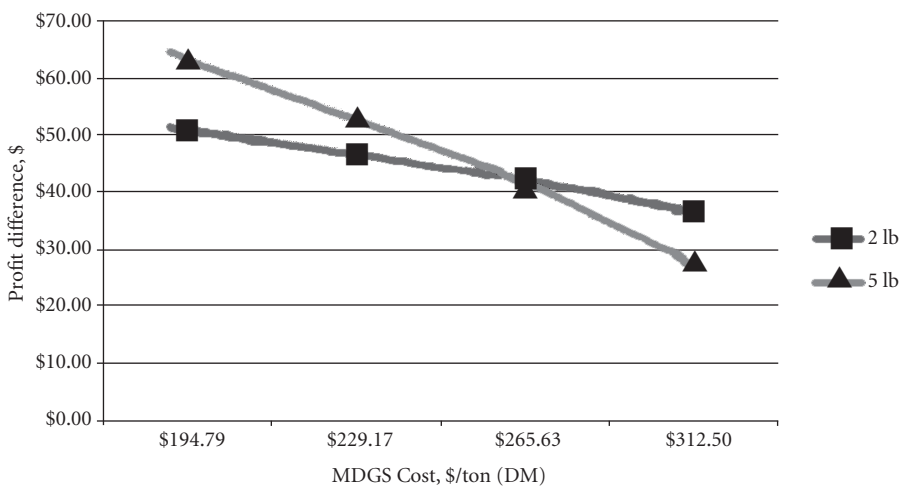

Figure 2. Effect of MDGS price and supplementation level on profitability.

is $.80/head/day. However, previous research suggests forage savings is 6.8 and 17%/head for 2 lb and 5 lb (DM) MDGS supplementation (*2010 Nebraska Beef Cattle Report*, pp. 44-43). Correspondingly, stocking rate and profitability/acre can be increased. Therefore, the assumed pasture rent for the 2 lband 5 lb (DM) MDGS supplementation is $.75 and $.66/head/day.

Results

Average Daily Gain and Efficiency

As actual supplement intake increased , ADG increased quadratically ($P < 0.01$ Figure1). The actual supplement intake regression equation ($y = -5.4146x^2 + 5.1705x + 1.7231$) predicts maximal ADG at the MDGS supplementation level of x = 0.48% BW with y = 2.95 lb ADG ($r^2 =. 72$).

As the MDGS supplementation increased from 0 lb to 2 lb to 5 lb (DM), the greatest gain response of 26.3% occurred between 0 lb and 2 lb (DM) supplementation (Table 1). The high gain response is due to the steer's MP requirements being met by the RUP of MDGS. The 11.1% increase in ADG from 2 lb to 5 lb MDGS (DM) is due to the additional energy consumed (Table 1). The added gain from the 5 lb MDGS (DM) supplementation may be advantageous when selling cattle at the end of the feeding period. However, feeding 2 lb (DM) may be more advantageous with high priced MDGS.

Economic Analysis

In general, steers supplemented MDGS and non-supplemented steers gained 2.24 and 1.55 lb, respectively. Supplemented steers generated $28.17 to $63.48 more profit compared to non-supplemented steers across all MDGS levels and prices (Figure 2). Increasing supplementation from 2 lb to 5 lb (DM) increased ADG .27 lb. Feeding 5 lb (DM) MDGS level was more profitable when MDGS price was below $265.63/ton (DM) (85% the price of 7.50/bu corn). Supplementing 2 lb MDGS (DM) became more profitable than supplementing 5 lb MDGS (DM) by $0.10 /lb as MDGS prices increased above $265.63/ton. This analysis suggests that supplementing MDGS for maximal ADG is not always the most economical. This is because DGS prices have recently increased more rapidly than both grass and cattle prices. In the current economic scenario, grazing yearlings would be more profitable when supplemented DGS, but the amount that should be supplemented depends on price relative to corn, grass, and cattle. When expensive, use as a protein source for grazing cattle is more logical (i.e., 2 lb/day (DM)) than feeding at higher levels.

[1]Tyler L. Hasenauer, graduate student; Terry Klopfenstein, professor; Cody Schneider, research technician; Jim MacDonald, associate professor; Dirk Burken, research technician, University of Nebraska–Lincoln Department of Animal Science, Lincoln, Neb.

© The Board of Regents of the University of Nebraska. All rights reserved.